Work Order ID 75638

October-27-11 11:40:17 AM

75638

Item ID: D6005-128 **Accept** *N900040100* **Setup Start** *NS1*

Revision ID:

Item Name: Crosstube Material **Stop** *NS2*

Start Date: 27/10/2011 **Start Qty:** 20.00 *20*

Required Date: 30/05/2013 **Req'd Qty:** 20.00 *20*

Reference:

Cust Item ID:

Customer:

Approvals: **Process Plan:** M L J **Date:** 11/10/27 **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Run Start *NR1*

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	**Revision Nbr**								
D6005	Rev A								
100		0.00							
100	PURCHASING					CL	11/11/03	20	
Purchasing		0.00							
Purchasing	**Memo** Issue P/O: 15348 a) Order as per Dwg D6005 b) Material: 2.750 x 0.375 wall 7075-T6/T6511 (WW-T-700/7 or QQ-A-225/9 or QQ-A-200/11) seamless aluminum tube c) Minimum ultimate tensile strength = 77 ksi d) Minimum tensile yield strength = 66 ksi e) Tolerance are per ASTM B210 (see details on Dwg D6005) f) Material certification required								
110	Receive & Inspect for Damage & Mat'l Certs	0.00							
110						12/3/28	21		
Packaging		0.00							
Packaging	**Memo** Ensure material certification is attached								

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Item ID: D6005-128 **Accept** *N900040100* **Setup Start** *NS1*
Revision ID: **Stop** *NS2*
Item Name: Crosstube Material
Start Date: 27/10/2011 **Start Qty:** 20.00 *20*
Required Date: 30/05/2013 **Req'd Qty:** 20.00 *20*
Reference:
Cust Item ID:
Customer:

Run Start *NR1*
Stop *NR2*

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120 *120* QC Quality Control	QC6- Inspect dimensions to drawing	0.00				421			
	Memo Ensure Material certification comply to Dwg D6005	0.00							
150 *150* Packaging Packaging	Identify as per dwg & Stock Location: 26 MAT 27	0.00							
	Memo	0.00							
160 *160* QC Quality Control	QC21- Final Inspection - Work Order Release	0.00							
	Memo	0.00							

DAS 16 9-89 B/05/01
Plan see Attached Extrusion Inspection Report.
(cut)
~~LANDING GEAR MAT 27~~
KC 13-5-2-
13/5/13
13-05-2

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Picklist Print

October-27-11 11:40:23 AM

Work Order ID: 75638 *75638*

Parent Item: D6005-128 *D6005-128*

Parent Item Name: Crosstube Material

Start Date: 27/10/2011 **Required Date:** 30/05/2013

Start Qty: 20.00 **Required Qty:** 20.00

Comments: IPP Rev:C04.06.15Added tolerance to Step 2KJ/JLM
IPP Rev:D 08-09-23 fixe typo in dwg name DD verified by:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6005-128P *D6005-128P* Crosstube material		Purchased	No			110	Each	16.0000	1 **	20	19/3/12		

Location	Loc Qty	Loc Code
MAT	16	
71349	16	

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

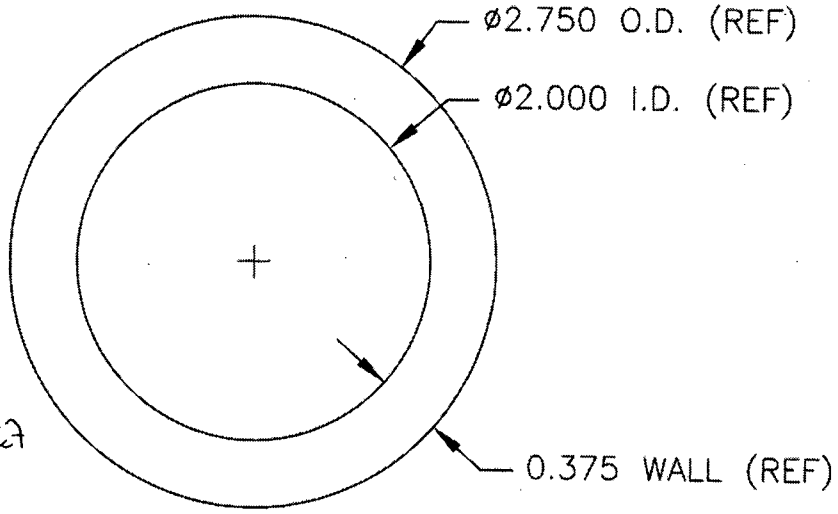
NOTE: Date & initial all entries

DESIGN	DRAWN BY	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED	APPROVED	DRAWING NO. D6005	REV. A SHEET 1 OF 1
DATE 00.11.17		TITLE CROSSTUBE MATERIAL	SCALE 1:1
A	00.11.17	NEW ISSUE	

SPECIFICATION CONTROL DRAWING

RELEASED
00.11.24

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 75638
M.L.J
11/10/27



NOTES

1) D6005–XXX CROSSTUBE
LENGTH

WHERE XXX IS LENGTH IN INCHES
EG. 128" LONG TUBE: D6005–128

2) MATERIAL: 2.750 OD x 0.375 WALL 7075–T6/T6511 (WW–T–700/7 OR QQ–A–225/9 OR QQ–A–200/11) SEAMLESS ALUMINUM TUBE.
MINIMUM ULTIMATE TENSILE STRENGTH = 77 ksi
MINIMUM YIELD TENSILE STRENGTH = 66 ksi
3) TOLERANCES ARE PER ASTM B210 AS FOLLOWS:
O.D.: ± 0.006 MEAN (±0.012 INCLUDING OVALITY)
WALL: ±0.015 MEAN (±0.038 INCLUDING ECCENTRICITY)
LENGTH: XXX +0.125/–0.000
STRAIGHTNESS: 0.010" DEVIATION / 12" LENGTH
4) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
5) CHEMICAL CONVERSION COAT PER DART QSI 005 4.1

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

DART aerospace
Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID PO15348

Purchase Order Date 11/03/11
PO Print Date 12/07/11

Order From : VU-ALU001

ALUMINIUMWERK UNNA AG
630 3033 SOUTH PARKER RD
AURORA, CO 80014
USA

Contact Name		**Buyer**	Chantal Lavoie
Vendor Phone	303 755 5672	**Requisition Nbr**	
Vendor Fax	303 755 5936	**Tax Resale Nbr**	10127-2607
Vendor Account Nbr		**Terms**	Net 30
		Currency	USD
		FOB	Destination-Collect

Ship To : DART AEROSPACE LTD 1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

REVISED

Line Nbr	Reference / Revision ID / Vendor Part Number	Description / Mfg ID	Req Date / Taxable	Req Qty / Unit of Measure	Ship Method	Unit Price	Extended Price
1	D6005-128P	Crosstube material	2/28/13 Yes	20.00 Each		$470.0000	$9,400.00

Dec 21

Special Inst: AS PER DWG D6005 REV. A
B75638
MATERIAL: 7075-T6/T6511 AS PER WW-T-700/7 OR
QQ-A-200/11 OR QQ-A-225/9 SEAMLESS TUBE
MINIMUM ULTIMATE TENSILE STRENGTH = 77 KSI
MINIMUM TENSILE YIELD STRENGTH = 66 KSI
SIZE: 2.750" OD X 0.375" WALL X 128" LONG

PO Total: **$9,400.00**

CL

No substitution or deviation without consent.
Certificate of Conformity or Material Certification required when applicable

Change Nbr: 2 **Change Date:** 12/07/11

Packinglist ALUnna AG

ALUnna ref. no.	44991/100
Customer PO.	Po. 15348
Date:	02.18.13

Boxmarking:

Dart Aerospace Po. 15348
D6005-128
Made in Germany Dest.: Hawkesbury Ont, Canada

We hereby declare that the wooden packing material are totally free from bark and apparently free from live plant pests

Item no.	Box no.	OD (inch)	ID (inch)	Wall (inch)	Net Weight (lbs)	Tare lbs	Gross Weight	Pieces	lengths (ft)	Boxdimension Lengths (inch)	Width (inch)	height (inch)	Cast. / Heat No. Top	Pcs.	Cast. / Heat No. Middle	Pcs.	Cast. / Heat No. Bottom
100	1	2,750	2,000	0,375	772	245	1016	21	10,666	151,575	22,441	22,441			8502/1401483	21	
					772	245	1016	21				1,251 m³					

S:\VERSAND\USA_Packliste\44991_100

Abnahmeprüfzeugnis 3.1 - DIN EN 10204:2005

Inspection Certificate 3.1 - DIN EN 10204:2005 / Certificat de Reception 3.1- DIN EN 10204:2005

Kunde: *Client:* Dart Aerospace Ltd.
1270 Aberdeen Street
K6A1K7 Hawkesbury, ON Canada

Zeugnisnummer: *Cert No.: / No. du certificat:* 1798/12

Bestellnummer: *Order No. / No. de commande* PO 15348

Produkt: *Product / Produit:* Rohre nahtlos gepresst / *Tubes seamless extruded*

Auftrag: *Our Reference/Notre Reference:* 44991/100

Spezifikation: *Specification:* AMS - QQ - A - 200/11; Spezifikation Dart Aerospace D6005

Werkstoff: *Alloy/Alliage:* 7075

Zustand: *Temper/État* T 6511

Abmessung *Size / Dimension* 2,750 INCH x 2,000 INCH x 0,375 INCH x 128,000 INCH
D6005-128 2.750 x 0.375 x 128

Kennzeichnung *Marking/Marquage:* ALUnna - Cert No. 1798/12 -. 7075-T6511 - Cast No. 8502 - AMS QQA 200/11 - 2.750" OD X 0.375" Wall - Heat Lot No. 1401483 - ALUnna - Order Conf. No. 44991/100-1 - PO. 15348

Lieferung *Delivered Material / Matérial délivre:* pcs. 21 lbs 772

Country of Manufacture: Germany
Products are in accordance with applicable RoHS

1. Chemische Analyse — *Chemical Analysis / analyse chimique*

Other elements each max. 0,05 %, total 0,15 %

		Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Pb	Zr	Bi	Sn	Ni
Charge/ Cast No.	min.			1,2		2,1	0,18	5,1						
	max.	0,40	0,50	2,0	0,30	2,9	0,28	6,1	0,20					
8502/12		0,092	0,183	1,486	0,060	2,549	0,220	5,803	0,046	0,003	0,0333	0,0001	0,0015	0,0001

Hydrogen content: 0,10 **ccm/100 g Al** Elements without indication < 0,01 % **country of melt manufacturer: Germany**

2. Mechanische Eigenschaften — *Mechanical Properties / Valeurs Mécaniques*

Anforderungen Requirements		tensile (Rm) ksi	yield (Rp0,2) ksi	elongation 2" %	elongation A %	Hardness HB	Heat Lot No.
	min.	77,0	66,0				
	max.						
1		87,000	79,605	10,0			1401483

8 13/05/01

RMS outside 25 - max. 22,5 µ"

Ergebnis der Prüfungen: Es wird bestätigt, daß die Lieferung geprüft wurde und den Vereinbarungen bei der Bestellannahme entspricht

Test results: We confirm that the delivery has been tested and applies to the agreements made on receipt of the order

Resultats: Nous confirmons que la livraison a été controlée et correspond avec les conventions faites à la réception de la commande

mergardtr

02.01.2013

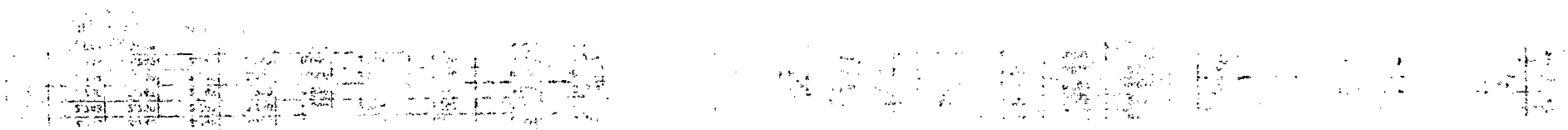
Certified acc. DIN EN ISO 9001:2008 and DIN EN 9100:2003
valid until 2013-11-10
Cert.- Reg. No.: 001959 QM08; 001959 ASH

ALUnna

Abnahmebeauftragter

EXTRUSION INSPECTION SHEET

		SIDE A	SIDE B					ULTRA SONIC MEASURMENTS				
TUBE #	TOTAL LENGTH	DIA two readings	DIA two readings	INSIDE DIA	wall thickness measured w/vern	Strightness at 12"in middle	Rockwell Reading	LOCATION on tube	R1	R2	R3	R4
DWG	128.00"	2.750"		2.000"	0.375"	0.010"	N/A	Middle	N/A			
1	128.00"	2.743"/2.751"	2.747"/2.751"	1.978"	0.375"/0.381"	0.004"	N/A	Middle	0.379"	0.379"	0.389"	0.388"
2	128.00"	2.748"/2.751"	2.748"/2.751"	1.981"	0.373"/0.386"	0.005"	N/A	Middle	0.375"	0.386"	0.390"	0.384"
3	128.00"	2.749"/2.751"	2.744"/2.749"	1.983"	0.376"/0.386"	0.004"	N/A	Middle	0.381"	0.390"	0.382"	00384"
4	128.00"	2.747"/2.749"	2.743"/2.747"	1.981"	0.373"/0.386"	0.005"	N/A	Middle	0.384"	0.382"	0.382"	0.384"
5	128.00"	2.748"/2.751"	2.745"/2.746"	1.982"	0.375"/0.385"	0.002"	N/A	Middle	0.384"	0.385"	0.384"	0.387"
6	128.00"	2.745"/2.747"	2.743"/2.750"	1.986"	0.373"/0.380"	0.0025"	N/A	Middle	0.385"	0.386"	0.384"	0.389"
7	128.00"	2.745"/2.751"	2.746"/2.747"	1.979"	0.372"/0.377"	0.003"	N/A	Middle	0.390"	0.396"	0.386"	0.374"
8	128.00"	2.748"/2.750"	2.748"/2.749"	1.984"	0.363"/0.388"	0.0035"	N/A	Middle	0.387"	0.377"	0.384"	0.387"
9	128.00"	2.749"/2.748"	2.745"/2.749"	1.987"	0.371"/0.383"	0.005"	N/A	Middle	0.387"	0.376"	0.386"	0.394"
10	128.00"	2.745"/2.747"	2.742"/2.748"	1.977"	0.374"/0.385"	0.003"	N/A	Middle	0.389"	0.384"	0.389"	0.392"
11							N/A	Middle				
12							N/A	Middle				
13							N/A	Middle				
14							N/A	Middle				
15							N/A	Middle				
PART # D6008-128		P/O# 15348			BATCH # B75638			Notes:				



MEAN OUTSIDE DIAMETER PERMISSIBLE +- 0.006 side A									
Tube #	Actual A	Actual B	Mean	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.743	2.751	2.747	2.750	0.006	2.744	2.756	0.003	-0.009
2	2.748	2.751	2.750	2.750	0.006	2.744	2.756	0.006	-0.006
3	2.749	2.751	2.750	2.750	0.006	2.744	2.756	0.006	-0.006
4	2.747	2.749	2.748	2.750	0.006	2.744	2.756	0.004	-0.008
5	2.748	2.751	2.750	2.750	0.006	2.744	2.756	0.006	-0.006
6	2.745	2.747	2.746	2.750	0.006	2.744	2.756	0.002	-0.010
7	2.745	2.751	2.748	2.750	0.006	2.744	2.756	0.004	-0.008
8	2.748	2.750	2.749	2.750	0.006	2.744	2.756	0.005	-0.007
9	2.749	2.748	2.749	2.750	0.006	2.744	2.756	0.004	-0.007
10	2.745	2.747	2.746	2.750	0.006	2.744	2.756	0.002	-0.010
11			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
12			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
13									
14									
15									
16									

MEAN OUTSIDE DIAMETER PERMISSIBLE +- 0.006 Side B									
Tube #	Actual A	Actual B	Mean	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.747	2.751	2.749	2.750	0.006	2.744	2.756	0.005	-0.007
2	2.748	2.751	2.750	2.750	0.006	2.744	2.756	0.006	-0.006
3	2.744	2.749	2.747	2.750	0.006	2.744	2.756	0.002	-0.009
4	2.743	2.747	2.745	2.750	0.006	2.744	2.756	0.001	-0.011
5	2.745	2.746	2.746	2.750	0.006	2.744	2.756	0.001	-0.011
6	2.743	2.750	2.747	2.750	0.006	2.744	2.756	0.002	-0.009
7	2.746	2.747	2.747	2.750	0.006	2.744	2.756	0.002	-0.009
8	2.748	2.749	2.749	2.750	0.006	2.744	2.756	0.004	-0.007
9	2.745	2.749	2.747	2.750	0.006	2.744	2.756	0.003	-0.009
10	2.742	2.748	2.745	2.750	0.006	2.744	2.756	0.001	-0.011
11			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
12			#DIV/0!		0.006	-0.006	0.006	#DIV/0!	#DIV/0!
13									
14									
15									
16									

OUTSIDE DIA. Permissible (with Ovality) +- 0.012 side A							
Tube #	Actual A	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.743	2.750	0.012	2.738	2.762	0.005	-0.019
2	2.748	2.750	0.012	2.738	2.762	0.010	-0.014
3	2.749	2.750	0.012	2.738	2.762	0.011	-0.013
4	2.747	2.750	0.012	2.738	2.762	0.009	-0.015
5	2.748	2.750	0.012	2.738	2.762	0.010	-0.014
6	2.745	2.750	0.012	2.738	2.762	0.007	-0.017
7	2.745	2.750	0.012	2.738	2.762	0.007	-0.017
8	2.748	2.750	0.012	2.738	2.762	0.010	-0.014
9	2.749	2.750	0.012	2.738	2.762	0.011	-0.013
10	2.745	2.750	0.012	2.738	2.762	0.007	-0.017
11			0.012	-0.012	0.012	0.012	-0.012
12			0.012	-0.012	0.012	0.012	-0.012
13							
14							
15							
16							

OUTSIDE DIA. Permissible (with Ovality) +- 0.012 side b							
Tube #	Actual A	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.747	2.750	0.012	2.738	2.762	0.009	-0.015
2	2.748	2.750	0.012	2.738	2.762	0.010	-0.014
3	2.744	2.750	0.012	2.738	2.762	0.006	-0.018
4	2.743	2.750	0.012	2.738	2.762	0.005	-0.019
5	2.745	2.750	0.012	2.738	2.762	0.007	-0.017
6	2.743	2.750	0.012	2.738	2.762	0.005	-0.019
7	2.746	2.750	0.012	2.738	2.762	0.008	-0.016
8	2.748	2.750	0.012	2.738	2.762	0.010	-0.014
9	2.745	2.750	0.012	2.738	2.762	0.007	-0.017
10	2.742	2.750	0.012	2.738	2.762	0.004	-0.020
11			0.012	-0.012	0.012	0.012	-0.012
12			0.012	-0.012	0.012	0.012	-0.012
13							
14							
15							
16							

OUTSIDE DIA. Permissible (with Ovality) +- 0.012 side A							
Tube #	Actual B	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.751	2.750	0.012	2.738	2.762	0.013	-0.011
2	2.751	2.750	0.012	2.738	2.762	0.013	-0.011
3	2.751	2.750	0.012	2.738	2.762	0.013	-0.011
4	2.749	2.750	0.012	2.738	2.762	0.011	-0.013
5	2.751	2.750	0.012	2.738	2.762	0.013	-0.011
6	2.747	2.750	0.012	2.738	2.762	0.009	-0.015
7	2.751	2.750	0.012	2.738	2.762	0.013	-0.011
8	2.750	2.750	0.012	2.738	2.762	0.012	-0.012
9	2.748	2.750	0.012	2.738	2.762	0.010	-0.014
10	2.747	2.750	0.012	2.738	2.762	0.009	-0.015
11			0.012	-0.012	0.012	0.012	-0.012
12			0.012	-0.012	0.012	0.012	-0.012
13							
14							
15							
16							

OUTSIDE DIA. Permissible (with Ovality) +- 0.012 side b							
Tube #	Actual B	Nominal	Tolerance	min allowable dimension	max allowable dimension	Results for min allowable	Results for max allowable
1	2.751	2.750	0.012	2.738	2.762	0.013	-0.011
2	2.751	2.750	0.012	2.738	2.762	0.013	-0.011
3	2.749	2.750	0.012	2.738	2.762	0.011	-0.013
4	2.747	2.750	0.012	2.738	2.762	0.009	-0.015
5	2.746	2.750	0.012	2.738	2.762	0.008	-0.016
6	2.750	2.750	0.012	2.738	2.762	0.012	-0.012
7	2.747	2.750	0.012	2.738	2.762	0.009	-0.015
8	2.749	2.750	0.012	2.738	2.762	0.011	-0.013
9	2.749	2.750	0.012	2.738	2.762	0.011	-0.013
10	2.748	2.750	0.012	2.738	2.762	0.010	-0.014
11			0.012	-0.012	0.012	0.012	-0.012
12			0.012	-0.012	0.012	0.012	-0.012
13							
14							
15							
16							

end measuement with vern

Mean OUTSIDE DIA. Permissible +- 0.015									
Tube	Actual A	Actual B	Mean	Nominal	Tolerance	min	max	min	max
1	**0.375**	**0.381**	**0.378**	**0.375**	**0.015**	**0.360**	**0.390**	**0.018**	**-0.012**
2	**0.373**	**0.386**	**0.380**	**0.375**	**0.015**	**0.360**	**0.390**	**0.0195**	**-0.011**
3	**0.376**	**0.386**	**0.381**	**0.375**	**0.015**	**0.360**	**0.390**	**0.021**	**-0.009**
4	**0.373**	**0.386**	**0.380**	**0.375**	**0.015**	**0.360**	**0.390**	**0.0195**	**-0.011**
5	**0.375**	**0.385**	**0.380**	**0.375**	**0.015**	**0.360**	**0.390**	**0.02**	**-0.010**
6	**0.373**	**0.380**	**0.377**	**0.375**	**0.015**	**0.360**	**0.390**	**0.0165**	**-0.014**
7	**0.372**	**0.374**	**0.373**	**0.375**	**0.015**	**0.360**	**0.390**	**0.013**	**-0.017**
8	**0.363**	**0.388**	**0.376**	**0.375**	**0.015**	**0.360**	**0.390**	**0.0155**	**-0.015**
9	**0.371**	**0.383**	**0.377**	**0.375**	**0.015**	**0.360**	**0.390**	**0.017**	**-0.013**
10	**0.374**	**0.385**	**0.380**	**0.375**	**0.015**	**0.360**	**0.390**	**0.0195**	**-0.011**
11			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
12			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
13			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
14			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
15			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!

OUTSIDE DIA. Permissible +- 0.038								
Tube	Actual A	Actual B	Nominal	Tolerance	min	max	min	max
1	**0.375**	**0.381**	**0.375**	**0.038**	**0.337**	**0.413**	**0.038**	**-0.032**
2	**0.373**	**0.386**	**0.375**	**0.038**	**0.337**	**0.413**	**0.036**	**-0.027**
3	**0.376**	**0.386**	**0.375**	**0.038**	**0.337**	**0.413**	**0.039**	**-0.027**
4	**0.373**	**0.386**	**0.375**	**0.038**	**0.337**	**0.413**	**0.036**	**-0.027**
5	**0.375**	**0.385**	**0.375**	**0.038**	**0.337**	**0.413**	**0.038**	**-0.028**
6	**0.373**	**0.380**	**0.375**	**0.038**	**0.337**	**0.413**	**0.036**	**-0.033**
7	**0.372**	**0.374**	**0.375**	**0.038**	**0.337**	**0.413**	**0.035**	**-0.039**
8	**0.363**	**0.388**	**0.375**	**0.038**	**0.337**	**0.413**	**0.026**	**-0.025**
9	**0.371**	**0.383**	**0.375**	**0.038**	**0.337**	**0.413**	**0.034**	**-0.030**
10	**0.374**	**0.385**	**0.375**	**0.038**	**0.337**	**0.413**	**0.037**	**-0.028**
11				0.038	-0.038	0.038	0.038	-0.038
12				0.038	-0.038	0.038	0.038	-0.038
13				0.038	-0.038	0.038	0.038	-0.038
14				0.038	-0.038	0.038	0.038	-0.038
15				0.038	-0.038	0.038	0.038	-0.038

center measurment with ultra sonic

Mean OUTSIDE DIA. Permissible +- 0.015									
Tube	highest	lowest	Mean	Nominal	Tolerance	min	max	min	max
1	**0.389**	**0.379**	**0.384**	**0.375**	**0.015**	**0.360**	**0.390**	**0.024**	**-0.006**
2	**0.390**	**0.375**	**0.383**	**0.375**	**0.015**	**0.360**	**0.390**	**0.0225**	**-0.008**
3	**0.390**	**0.381**	**0.386**	**0.375**	**0.015**	**0.360**	**0.390**	**0.0255**	**-0.005**
4	**0.387**	**0.382**	**0.385**	**0.375**	**0.015**	**0.360**	**0.390**	**0.0245**	**-0.006**
5	**0.389**	**0.384**	**0.387**	**0.375**	**0.015**	**0.360**	**0.390**	**0.0265**	**-0.004**
6	**0.389**	**0.384**	**0.387**	**0.375**	**0.015**	**0.360**	**0.390**	**0.0265**	**-0.004**
7	**0.396**	**0.374**	**0.385**	**0.375**	**0.015**	**0.360**	**0.390**	**0.025**	**-0.005**
8	**0.387**	**0.377**	**0.382**	**0.375**	**0.015**	**0.360**	**0.390**	**0.022**	**-0.008**
9	**0.394**	**0.376**	**0.385**	**0.375**	**0.015**	**0.360**	**0.390**	**0.025**	**-0.005**
10	**0.392**	**0.384**	**0.388**	**0.375**	**0.015**	**0.360**	**0.390**	**0.028**	**-0.002**
11			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
12			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
13			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
14			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!
15			#DIV/0!		0.015	-0.015	0.015	#DIV/0!	#DIV/0!

OUTSIDE DIA. Permissible +- 0.038								
Tube	highest	lowest	Nominal	Tolerance	min	max	min	max
1	**0.389**	**0.379**	**0.375**	**0.038**	**0.337**	**0.413**	**0.052**	**-0.034**
2	**0.390**	**0.375**	**0.375**	**0.038**	**0.337**	**0.413**	**0.053**	**-0.038**
3	**0.390**	**0.381**	**0.375**	**0.038**	**0.337**	**0.413**	**0.053**	**-0.032**
4	**0.387**	**0.382**	**0.375**	**0.038**	**0.337**	**0.413**	**0.050**	**-0.031**
5	**0.389**	**0.384**	**0.375**	**0.038**	**0.337**	**0.413**	**0.052**	**-0.029**
6	**0.389**	**0.384**	**0.375**	**0.038**	**0.337**	**0.413**	**0.052**	**-0.029**
7	**0.396**	**0.374**	**0.375**	**0.038**	**0.337**	**0.413**	**0.059**	**-0.039**
8	**0.387**	**0.377**	**0.375**	**0.038**	**0.337**	**0.413**	**0.050**	**-0.036**
9	**0.394**	**0.376**	**0.375**	**0.038**	**0.337**	**0.413**	**0.057**	**-0.037**
10	**0.392**	**0.384**	**0.375**	**0.038**	**0.337**	**0.413**	**0.055**	**-0.029**
11				0.038	-0.038	0.038	0.038	-0.038
12				0.038	-0.038	0.038	0.038	-0.038
13				0.038	-0.038	0.038	0.038	-0.038
14				0.038	-0.038	0.038	0.038	-0.038
15				0.038	-0.038	0.038	0.038	-0.038